

CHAPTER 1

INTRODUCTION

1.1 ENGINES LAYOUT

There are two major characteristics of a drivetrain that impact the performance of a car. First is the engine placement and second is the driving wheels location. The engine placement is a big factor to determine the moment of inertia and the weight distribution of car because many other mechanical and electrical components of a car are usually located close to the engine. Engines are placed in one of four locations on vehicles. The locations are rear mounted, mid engine, linear mount, and transverse mount.

A transverse engine is an engine in which the crankshaft is oriented side to side relative to the length of the vehicle. Most modern front wheel drive vehicles use this engine orientation while most rear wheel drive vehicle use a front to back longitudinal arrangement. The transverse engine is simply an engine that is mounted sideways so the output shaft from the transmission can connect to the front wheels in a front wheel drive car. The transverse engines were developed to improve fuel economy on four and six cylinder engines by pulling a car along the road and not pushing it. The other major reason for this was making the cars easier to manufacture on the assembly lines.

Basically it is taking the mid and rear mounted engine technologies and combining them.

1.2 ENGINE AND TRANSMISSION SIZE

Engine size was depending to the type of the engine, numbers of piston and valve, the arrangement of the piston and volume of the engine that will normally state in cubic centimeters (cc). Not all the engines were suitable for all types of cars. It depends to the chassis and design of the cars. The carburetor engines are the large size of the engine while an injection engine is compact engine and has a small size.

Transmission size was depending to the type of engine. Usually the same type of car has a same size of transmission. The engine and transmission size was important thing and this must consider to determine the mounting location and engine bay area.

1.3 PROJECT BACKGROUND

Engine and transmission location determination is an important step in car development. It can affect the vibration level of the car body. For a new car, the location of the engine mounting is an important factor and it must be analysed first. To analyze it, the center of gravity of the engine is proposed to be determined, so as the moment of inertia of the engine. These things can be very important to reduce the vibration through the chassis.

Engine vibration can also depend to the size and power of the engine. That explain why the proper engine location is substantial for a car. The method and calculation for the engine location can be determined to get the suitable engine location. All the type of the car can use this method to determine the engine location. A simulation test can be performed for the engine based on the method and numerical value.

1.4 PROBLEM STATEMENT

Method of locating engine and transmission will be proposed to determine the right position. This method depends to the size and type of engines. There could be many methods to locate the engine and transmission but not widely known in literature.

All the cars are assembled at the factory and the method is usually kept as an engineering known how to the research and development department. Every company can have their own method for the different types of car that will be produced. The performance of the vibration and harshness characteristics can be depending to this method and procedure. That can explain some cars to have customer complaints on that aspect.

At the workshop, the mechanics usually locate the engine and transmission based on their commonsense and engine bay space. The trial and error method are commonly used by the mechanics. The things that are usually considered are the mounting location and the size of the engine.

Based on the method of locating engine and transmission we can analyze the engine location based on CAE method. This method will enhance automotive design and is important for a repair process.

1.5 PROJECT OBJECTIVES

The project objective is to find a proper method to install a new engine and transmission for a new car. It is important to reduce the vibration from the engines and transmission to the car's body. The scope for this project is to study on the vibration reduction from the engines system to the car's body. The other scope is this analysis is for transverse engine mounting only. The stress analysis is done for side member of the